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American Competitiveness Institute

***Mechanical Shock, Humidity, Salt Fog
And Lead Residue Testing
September 21, 2004***

- Agenda

- Salt Atmosphere Testing Status
- Humidity Testing Status
- Mechanical Shock / Vibration Testing Status
- Lead Residue Testing Status



- Salt Atmosphere Test Status

- **Salt Atmosphere Testing Performed September, 2004**
 - *Based on ASTM B117 Test Method for 48 hours*
 - *SnPb Boards: Serial Numbers 35, 36, 37*
 - *SnAgCu Boards: Serial Numbers 104, 105, 106*
 - *SnAgCuBi Boards: Serial Numbers 143, 144, 145*
- **All Passed Salt Atmosphere Testing**
 - *Checked continuity on specific packages*
 - *Found some failures prior to the test*
 - *Found no failures after test*
 - *Report to be generated*



- Temperature Humidity Test Status

- Temperature Humidity Testing Being Scheduled
 - Based on MIL-STD 810F; Test Method 507.4
 - SnPb Boards: Serial Numbers 38, 39, 40
 - SnAgCu Boards: Serial Numbers 107, 108, 109
 - SnAgCuBi Boards: Serial Numbers 146, 147, 148
- Will Check Continuity Prior To Testing

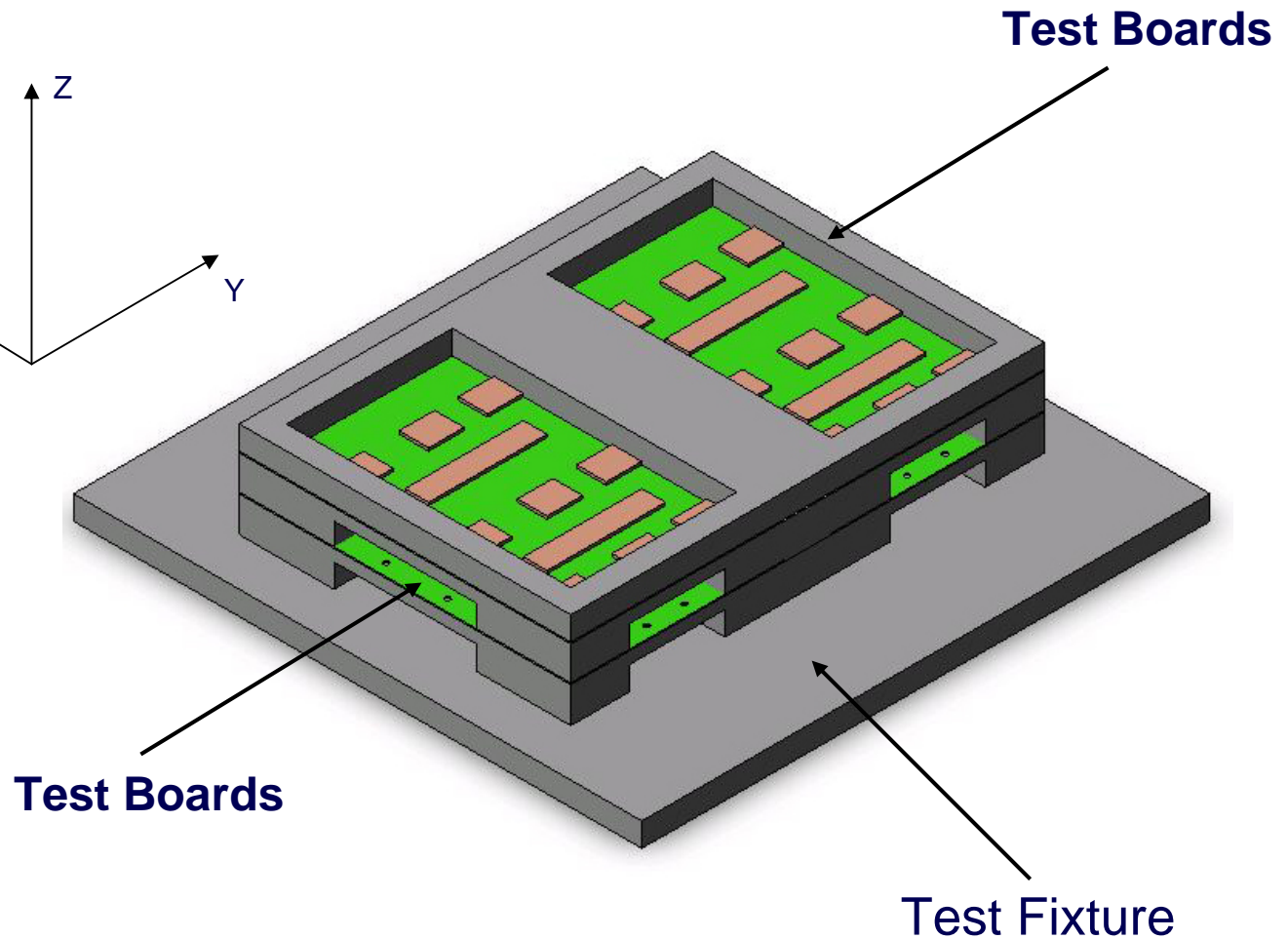
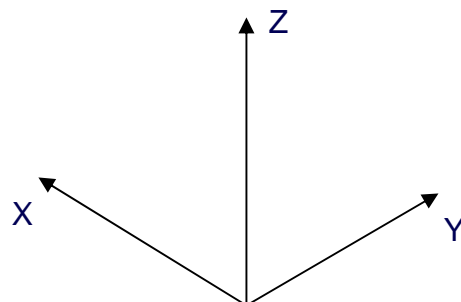


- Mechanical Shock / Vibration Test Status

- **Test Procedure Approved**
 - Tooling being designed and manufactured
 - Anatech System being ordered
- **All Boards Received**
- **Pathfinder Boards Identified**
 - *SnPb Boards: Serial Numbers 25, 61*
 - *Used to set-up test fixtures at BAE Systems*
- **Testing being scheduled with BAE Systems**
 - Will notify team when tests will be performed



Mechanical Shock, Humidity, Salt Fog And Lead Residue Testing



- Mechanical Shock / Vibration Test Status

- **Mechanical Shock Test Set 1**
 - *MIL-STD 810F; Method 516.5; Procedure 1*
- **Boards Identified**
 - *SnPb Boards: Serial Numbers 26, 27, 62, 63*
 - *SnAgCu Boards: Serial Numbers 95, 96, 151, 168*
 - *SnAgCuBi Boards: Serial Numbers 134, 135, 196, 197*



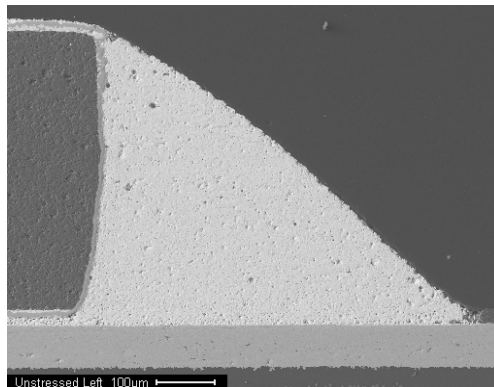
- Mechanical Shock / Vibration Test Status

- **Mechanical Shock Test Set 2**
 - *Modified version of MIL-STD 810F; Method 516.5; Procedure 1*
 - *Hardware will be tested to failure*
- **Boards Identified**
 - *SnPb Boards: Serial Numbers 28, 29, 64, 65*
 - *SnAgCu Boards: Serial Numbers 97, 98, 170, 171*
 - *SnAgCuBi Boards: Serial Numbers 136, 137, 198, 199*

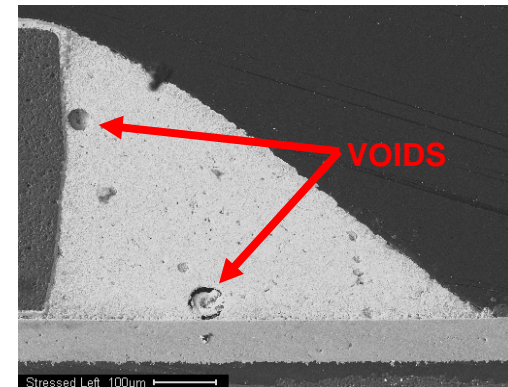


- Lead Residue Test Status

- **Metallurgy Analysis**
 - *Microsectioning*
 - *Determine what intermetallics are in Lead Free solder joints*
 - *Require direction and funding*
- **Examples of Lead Free Intermetallics**
 - *ACI Lockheed Martin Lead Free Solder Rapid Response Project*
 - *Hardware experienced 126 thermal cycles; -55°C to 125°C*



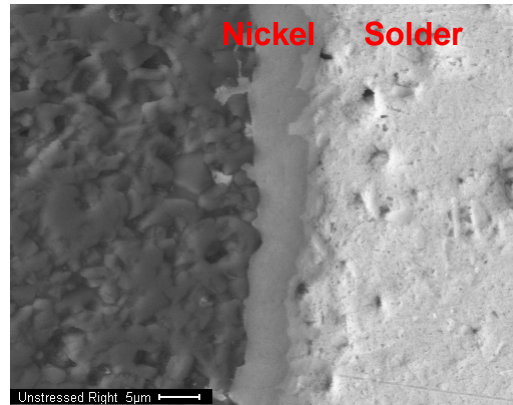
Unstressed Solder Joint



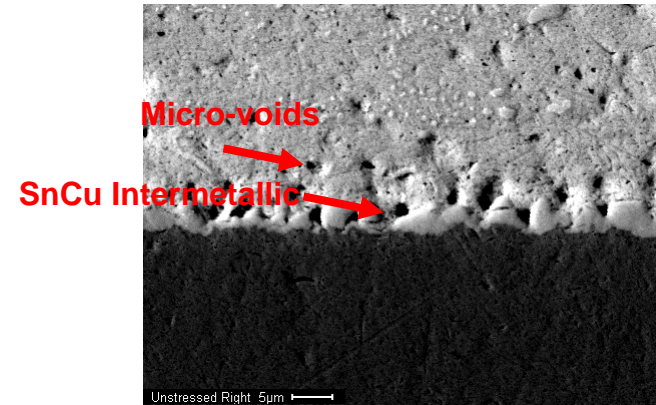
Stressed Solder Joint



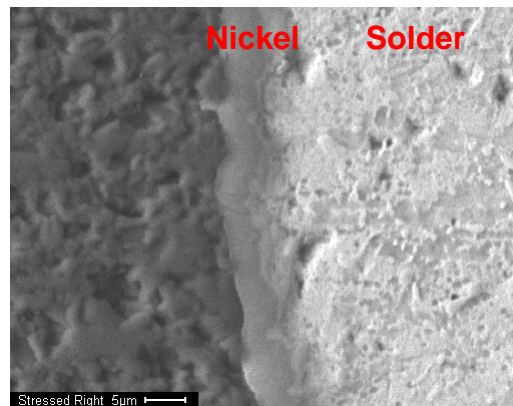
- Lead Residue Test Status



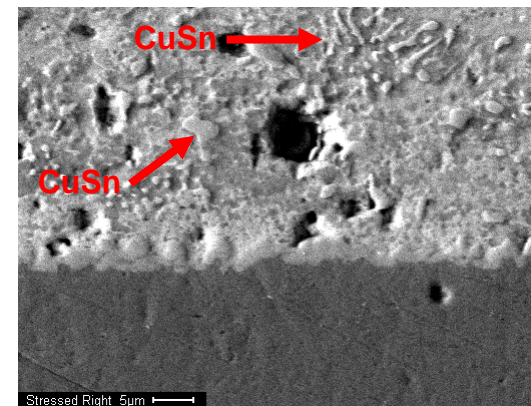
Unstressed Component Interface



Unstressed Pad Interface



Stressed Component Interface



Stressed Pad Interface

